

XX. ON A COLLECTION OF REPTILES AND
BATRACHIANS FROM THE MOUNTAINS OF
PAHANG, MALAY PENINSULA.

By MALCOLM A. SMITH, F.Z.S.

The present report is based upon collections made in two separate, but not far distant localities:—(1) from Gunong Tahan, the highest mountain of the Malay Peninsula, and (2) from Fraser's Hill, an area on the main peninsula range of considerably less altitude, north of the well-known Semangko Pass, between Selangor and Pahang, and not a part of the same range, and about 70 miles S.W. of Gunong Tahan.

The bulk of the collection is from the first-named locality, and was made by the F.M.S. Museums in connection with the meteorological survey of Gunong Tahan which has been undertaken during the past two years. I am indebted to Mr. Herbert Robinson, Director of Museums, for the privilege of examining it.

The following are the chief localities referred to:—

Kuala Teku. The confluence of the Tahan and Teku Rivers at the foot of the Tahan massif. Height about 550 feet above sea level.

Kuala Tahan. The confluence of the Tahan and Tembeling Rivers about fourteen miles below Kuala Teku. Height about 230 feet above sea level.

Wray's camp. A halting place about four hours walk from Kuala Teku. Height above sea level. 3,300 feet.

Padang. The main station on Gunong Tahan. Height above sea level about 5,400-5,700 feet.

Gunong Gedong. One of the peaks of the eastern Tahan range. Height above sea level about 6,400 feet.

All the specimens from Fraser's Hill were taken in June last, at an elevation of between 3,000 and 4,000 feet.

With regard to the text of the report, the numbers referred to are those of my own private register.

F.M.P., where used as a reference, indicates "Boulenger's Fauna of the Malay Peninsula, Reptilia and Batrachia, 1912."

The claim of *Rana lateralis* Boulenger, to be included in the fauna of the Peninsula, (based on a single specimen), is shown to be incorrect (see *R. miopus*).

Two new forms are described:—

Rana cataracta

Kalophrynus robinsoni.

Seven species appear new to the Peninsula:—

Chitra indica (Gray).

Coluber prasinus Blyth.

Polyodontophis collaris (Gray).

Lygosoma indicum (Gray).

Rana miopus Boulenger.

Rana picturata Boulenger.

Kaloula baleata (Mueller).

CHELONIANS.

Chitra indica (Gray).

Bouleng., Cat. Chelonians B.M., 1889, p. 264; Siebenrock, Zool. Jahrb., 1909, Suppl. 10, p. 608; Annandale, Rec. Ind. Mus., 1912, VII., p. 169, pl. VI., figs. 1 & 2.

The discovery of this species, one of the largest of the freshwater turtles, in the Malay Peninsula is a fine extension of its known range. It has previously been recorded from the Ganges and Irrawady river systems.

This turtle has also been met with in the Rathuri river, Western Siam, two adult specimens having been caught near Kanburi. These two examples, which I examined alive, differed from the description of the Indian form in that the disc was marked with numerous, pale broad lines and angular markings.

Although of not such a fierce disposition as the common *Trionyx cartilagineus*, they would when irritated suddenly shoot out their long necks with lightning-like rapidity and were capable of giving one a very severe bite.

Testudo impressa (Gunther).

Testudo latinuchalis, F.M.P., p. 15.

Testudo impressa, Malcolm Smith, Journ. N. H. S. Siam, 1922, IV., p. 204.

One adult male specimen from Fraser's Hill; length of shell in a straight line 260 mm. (No. 6591).

SNAKES.

***Typhlops nigroalbus*, D. & B.**

1 ad. from the Tembeling river.

26 scales round the body.

***Polyodontophis collaris* (Gray).**

Bouleng., Cat. Sn. Brit. Mus., 1893, I., p. 184.

1 ♂ from Padang, Gunong Tahan (No. 5980).

Sc. 17 rows throughout, V. 161, C. 100. Temporals 1 + 2, 10 supralabials. Total length 473 mm., tail 72.

Dark brown above; a black vertebral line and two pale lateral ones; a black occipital bar, and another just behind on the neck. All the markings are very indistinct. White below with a series of lateral spots, confluent with the colouring of the back. Upper lip with a white streak.

Gunong Tahan is a considerable extension southwards of the known range of this species. The specimen is considerably darker in colour than any of those I have seen from further north in Siam.

***Natrix chrysargus* (Schleg.).**

Tropidonotus chrysargus F.M.P., p. 127.

Seven examples from Kuala Teku and Kuala Tahan, 3 from Fraser's Hill. One juvenile (total length 240 mm.) is light brown in colour with black reticulations.

No.	Sex.	Ventrals.	Caudals.
5889	♂	159	80
5890	♂	159	82
5894	♂	156	88
5892	♂	164	92
6584	juv.	148	110
6586	juv.	160	106
5893	♀	146	58?
5891	juv.	156	88
6585	♀	161	30
	♂	161	89

***Macropisthodon rhodomelas* (Boie).**

Kuala Tahan 2 examples, Wray's camp 1 example.

No.	Sex.	Ventrals.	Caudals.
5896	♀	143	42
5898	♂	135	53
5897	juv.	139	48

Macropisthodon flaviceps (D. & B.).

1 ♂ Kuala Tahan. No. 5895.

Ventrals 119. Caudals 61.

Coluber oxycephalus Boie.

One immature female (No. 5979) from Kuala Tahan.

Scales 25.25.17., V. 246., C. 130. Green above paler below, tail yellowish-brown, unbarred.

Coluber prasinus Blyth.

Cat. Sn. Brit. Mus., II., 1894, p. 59.

One ♀ (No. 5999) from Wray's camp.

Previously known from the Eastern Himalayas to Shan States (Burma), this is a considerable extension of its range of distribution. Except in the longer loreal and shorter anterior chin shields this specimen agrees entirely with the description and with an example in the Indian Museum (No. 16663) from Yunnan with which I have compared it.

Loreal nearly twice as long as deep; one praecocular, not in contact with the frontal; temporals $2 + 2$; anterior chin shields a little shorter than the posterior; scales in 19 rows reducing to 13 before the vent. Ventrals 203, anal 2, caudals 105 (extreme tip of tail missing). Maxillary teeth 22; mandibular 25.

Dendrophis pictus (Gm.).

One ♀ Kuala Teku (No. 5975).

Scales 15.15.11. V. 160, C. 130.

Supralabials 8 and 9. The praecoculars in good contact with the frontal. Chin and throat white, rest of belly and tail below, pale bronze.

Macrocalamus lateralis Günth.

F.M.P., p. 153.

A single example of this rare snake from Padang, Gunong Tahan (No. 5981).

Scales in 15 rows throughout, ventrals 172. Caudals 30. A large loreal, twice as long as high; no distinct posterior chin shields.

Colour. Darker brownish above. A dark band from the eye to the last labial with a yellow border above; two indistinct yellow V shaped marks on the neck; labials yellow. Belly yellow spotted with black. A black line at the outer margin of the ventrals and a median subcaudal one. Total length 200 mm. Tail 30.

***Pseudorhabdium longiceps* (Cantor).**

One example from Fraser's Hill.

A common snake in the Peninsula at low levels but not usually found at any altitude.

***Calamaria pavementata* D. & B.**

F.M.P., p. 157.

One ♀ immature. Padang, Gunong Tahan.

Ventrals 164. Caudals 16.

***Psammodynastes pulverulentus* (Boie).**

Three adults. Padang, Gunong Tahan and Kuala Teku.

Scales 17.17.15., ventrals ♂ 170, ♀ 173, 174. Caudals ♂ 61, ♀ 57, 60.

This species and *Lachesis sumatrana* are the only species other than very rare on Gunong Tahan. Both are common there as on other high mountains in the Malay Peninsula.

***Doliophis intestinalis* (Luar.).**

F.M.P., p. 206.

Two examples from Kuala Tahan and Kuala Teku.

No. 5902, juv. V. 250., C. 26; No. 5903, ♀ V. 242. C. 21.

Colour (in spirit). Jet black above and on the sides, with 3 narrow white lines, the vertebral (not bifurcated) starting from the neck and extending to the tip of the tail, the laterals occupying the upper half of the outer row of scales and the lower half of the row next and extending to the vent. Belly with broad transverse bars of black and white; tail below orange, with two narrow bars. Top of head brown mottled black.

***Trimeresurus gramineus* (Shaw).**

Lachesis gramineus, F.M.P., p. 17.

Two specimens from Fraser's Hill. Green above, pale blue below; outer row of scales white in the upper half, dull red in the lower. This red pigment in the flank band is common in examples from farther north (N. Siam), but does not appear to have been recorded before from the Peninsula. It does not occur in specimens from Bangkok and the surrounding country where this snake is common.

Boulenger's statement (p. 217) that this species is without distinct canthus rostralis is not borne out in specimens I have examined. In most adults it is well marked.

Trimeresurus sumatranus (Raffles).

Lachesis sumatrana, F.M.P., p. 217.

One ♀. Kuala Teku. (No. 5978).

Scales 21.21.15. V. 186, C. 80. 7 scales between the supraoculars.

Verdant green above, with two chains of pink spots down the back coalescing on the base of the tail to form cross-bars. A pink temporal streak, and a white line down the side on the outermost row of scales. Ventrals and anterior subcaudals bright green; posterior half of tail red above, white below.

LIZARDS.

Gymnodactylus marmoratus (Kuhl.).

One young ♀ from Kuala Tahan (No. 6002).

Gonatodes kendalli (Gray).

F.M.P., p. 38; Malcolm Smith, Journ. N. H. S. Siam, 1916, II., p. 151.

One example from Fraser's Hill.

I have already (*loc. cit. sup.*), drawn attention to the fact that a form of this Gecko exists identical in all respects with the typical one except that the male possesses 6 to 8 preanal pores in an obtuse-angled series. The present example is another instance of this form, there being 6 pores separated by an enlarged scale.

Draco fimbriatus Kuhl.

One ♂ from Wray's camp, (No. 5983).

Draco melanopogon Bouleng.

Two ♂ from Kuala Tahan.

Draco volans Linn.

One ♀ from Kuala Tahan.

Draco formosus Bouleng.

F.M.P., p. 61.

One ad. ♂, 1 ad. ♀, Kuala Teku Nos. 5984, 5907.

The female specimen confirms what I have previously stated (Journ. N. H. S. Siam, II., p. 153) that the throat is maroon or crimson, not green as given by authors.

Gonyocephalus borneensis (Schleg.).

1 ad. ♂, No. 5906. The gular sac in this specimen is unusually small.

***Gonyocephalus robinsoni* Bouleng.**

Journ. F.M.S. Mus. III., 1908, p. 65, pl. V.; idem. F.M.P., p. 67, fig. 19.

One ♀ ad. and 1 juv. from Padang, Gunong Tahan.

Previously known from 1 ad. ♂ and 1 young one. The adult agrees well with Boulenger's description. The gular pouch is fully as large as in the male. There are a few unevenly disposed enlarged scales upon the flanks. 9 upper and 9 lower labials; 72 scales round the middle of the body, the laterals not much smaller than the dorsals. The third and fourth fingers are of equal length.

Head and body, 125 mm., tail 300.

The juv. (No. 5990) has a head and body of 46 mm., and a tail of 105. Gular pouch well developed. 8 upper and 8 lower labials. About 80 scales round the body with enlarged ones as in the adult.

***Calotes floweri* Bouleng.**

F.M.P., p. 70.

One juv. from Gunong Gedong, No. 5905.

Fifty-seven scales round the middle of the body. Greyish brown above, without dark patches.

This form has not yet been found below 6,000 feet in the Malay Peninsula.

***Calotes cristatellus* (Kuhl.).**

F.M.P., p. 70.

Kuala Tahan, 2 ad. ♀., Nos. 5904, 5988.

Green with a large chocolate patch on either flank; the hind limb reaches the eye; 80 and 85 scales round the middle of the body. Boulenger's statement that this species has up to 120 scales round the middle of the body needs I think confirmation. I have never yet seen any examples with more than 100, although I have examined numerous specimens from all parts of the Malay Peninsula and Archipelago.

***Varanus dumerilii* (S. Müll.).**

F.M.P., p. 77.

Kuala Teku, 1 ex. (No. 5908).

A very young specimen which I refer to this species.

***Mabuia multifasciata* (Kuhl.).**

Seven specimens from Kuala Tahan and Kuala Teku.

Thirty-four scales round the body in five, 32 in two; dorsals tricarinate in all. The hind limb reaches the axilla in two.

Lygosama indicum (Gray).

Bouleng., Fauna Brit. Ind., Rept., p. 195.

Two young examples from Fraser's Hill.

As was expected, this lizard with its wide range from the Eastern Himalayas to Southern China, Burma, Siam and Indo-China has now been found also in the Malay Peninsula.

Lygosoma butleri Bouleng.

F.M.P., p. 91.

One example from Fraser's Hill (No. 6590). Hitherto recorded only from the Larut Hills, Perak.

Distance between the end of the snout and fore-limb less than $1\frac{1}{3}$ times in distance between axil and groin. 10 and 11 subdigital lamellae beneath the fourth toe.

Brown above and on the sides, thickly spotted with yellow. No dark lateral band. Below yellowish. From snout to vent 29 mm., tail 42.

Lygosoma olivaceum (Gray).

Two examples from Kuala Tahan.

Thirty scales round the body, dorsals tricarinate.

Lygosoma vittigerum Bouleng.

F.M.P., p. 94, Malcolm Smith, Journ. N. H. S. Siam, 1922, IV., p. 208.

One example from Kuala Teku (No. 5909).

It has 30 scales round the body and with the other specimen from Kuala Teku recorded by Boulenger has the praefrontals in broad contact with each other. These two specimens and one other from Ginting Bidai appear to be the only records of this species in the Malay Peninsula.

Lygosoma cophias Bouleng.

Journ. Fed. Mal. States Mus. III., p. 67, Pl. IV., Fig. 3; F.M.P., p. 96.

One spec. from Wray's camp. (No. 5910).

Known from a single specimen previously obtained on Gunong Tahan. This second example differs from the type description in the following particulars:—Distance between end of snout and fore-limb $1\frac{2}{3}$ times in distance between axil and groin. A pair of distinctly enlarged praecaudals. 10 lamellae beneath the fourth toe.

Head and body 35 mm., tail 48; arm 6; leg 9.

Lygosoma larutense Bouleng.

F.M.P., p. 97.

One specimen Padang, Gunong Tahan.

Previously known only from the Larut Hills, Perak. The specimen has 28 scales round the middle of the body. There are 6 and 7 supralabials, the fourth (or fifth) which is subocular being wedge-shaped, its apex not quite reaching the margin of the lip.

Total length 205, head and body 90; fore-limb 7; hind limb 10; from snout to fore-limb 20; fore-limb to hind limb 66 mm.

Dark grey on the back and sides, yellowish-white below. Neck with 3 narrow transverse, yellowish bars, back with 6 fine longitudinal lines.

BATRACHIANS.

Oxyglossus laevis Günth.

F.M.P., p. 225.

Seven examples from Kuala Tahan (Nos. 6045-6049) Largest 32 mm. from snout to vent.

I have recently also examined a large series of this frog from Mount Dulit, Borneo. The Gunong Tahan specimens agree well with the Bornean individuals, and differ from Siamese examples in the larger size of the discs of the toes and in having the belly always unspotted.

Rana laticeps Bouleng.

F.M.P., p. 230.

Three examples from Wray's camp and the Tahan river.

Very common on Fraser's Hill whence a large series was obtained.

Apparently known in the Peninsula previously, with certainty, only from Gunong Kledang, Perak.

The tibio-tarsal articulation may reach the tip of the snout.

Colour. Light or dark greyish with dark grey markings. The **A** shaped mark on the back is present in most juveniles, often enclosing a dull orange patch in life, but indistinct or absent in the adults. Below white, the throat and limbs with small black spots. A thin pale vertebral line sometimes present.

Rana doriae Bouleng.

Rec. Ind. Mus., 1920, XX, p. 49; F.M.P., p. 231; Malcolm Smith, Journ. N.H.S. Siam, 1922, IV, p. 217.

One female (No. 5922) from Kuala Teku,

Predominating colour above reddish-brown, with small black markings ; throat and chest handsomely mottled with brown.

***Rana plicatella* Stoliczka.**

Bouleng., Rec., Ind. Mus., 1920, XX, p. 53 ; Malcolm Smith, Journ. N.H.S. Siam, 1922, IV, p. 227.

Three adult males, Fraser's Hill. I have recently dealt very fully with these specimens and the place of this frog in the *R. doriae* group (*loc. cit. sup.*).

***Rana macrodon* D. & B.**

Rec. Ind. Mus., 1920, XX, p. 40.

Three half-grown examples from Kuala Tahan ; two adults and 1 half grown from Fraser's Hill.

I place these specimens under Boulenger's var. *blythii*, a dubious race as its characters do not coincide with any definite geographical distribution. In the younger specimens the tibio-tarsal articulation usually reaches to beyond the tip of the snout, in the adults to not quite so far.

***Rana glandulosa* Bouleng.**

Rec. Ind. Mus., 1920, XX, p. 181.

Two examples from Fraser's Hill.

***Rana picturata* Bouleng.**

Rec. Ind. Mus., 1920, XX, p. 179.

Seven examples from Kuala Teku and Kuala Tahan (Nos. 5913-5915 and 6028-6031). The species has hitherto been found only in Borneo. The largest, a male, is 57 mm. from snout to vent ; the largest female is 55 mm. Two females taken at the end of November are full of ripe ova.

Colouration. Black above, handsomely spotted and marked with yellow or yellowish-brown. Five of the specimens have a yellow band starting from the tip of the nose and passing along the canthus rostralis, the margin of the eyelid and down the back on either side to the groin. Lower parts brown, with small white spots in four examples, whitish, uniform in two, whitish with black spots in one.

Two of the specimens, both ♂, have large irregular flat glands on the back.

This species closely resembles *R. glandulosa* to which I at first referred them, but it can be recognized by the more extensive web to the toes, and the more ornate colouration. The male also has internal vocal vesicles.

***Rana luctuosa* (Peters).**

F.M.P., p. 238.

Fourteen examples from Fraser's Hill.

***Rana miopus* Bouleng.**

Rana miopus Bouleng., Journ. N.H.Soc. Siam, 1918, III, p. 11 ;
idem, Rec. Ind. Mus., 1920, XX, p. 149.

Rana lateralis, Laidlaw, P.Z.S., 1900, p. 886, pl. LVII, figs. 1 & 2 ;
Bouleng. (in part) F.M.P., 1912, p. 239.

Two adult males (Nos. 5911 & 5912) from Kuala Tembeling, and 1 juvenile (No. 6037) from Kuala Tahan.

Originally discovered in the mountains of Nakon Sritamarat, Peninsular Siam, this frog was described from an adult female specimen and a juvenile. A male taken at the same time, and until recently in my possession,* agrees well with these individuals from Gunong Tahan. They have the curious blackish, obliquely-running fine glandular folds across the back which are to be found only in one other species of frog from this region, namely *R. lateralis*. It turns out also that the frog recorded and figured by Laidlaw from Kuala Aring, Kelantan (P.Z.S., 1900) as this latter species, must be referred to *miopus*. Miss Procter has kindly examined this specimen, now in the Museum at Cambridge for me, and confirms my suspicions as to its identity.

In the three males examined by me the canthus rostralis is distinct ; the hind limb reaches to between the nostril and the eye ; the skin of the back is smooth in one and more or less studded with minute horny tubercles in two.

The vocal sacs are very prominent, appearing as distended pouches through a slit on either side of the throat in front of the fore-arm. They have a large flat oval gland at the shoulder and a thick pad on the inner side of the first finger.

Colour. Greyish-brown above and on the side, the glandular dorsal fold not darker ; a dark brown patch enclosing the tympanum ; upper lip lightish ; the limbs with dark bars ; a series of fine black lines running obliquely downwards from left to right between the dorso-lateral folds. Below yellowish-white.

The juvenile from Gunong Tahan is coloured pink, like the juvenile from the type locality.

As the Kuala Aring specimen is the only record of *Rana lateralis* in the Malay Peninsula, it must disappear from the fauna of this region.

* Now in the British Museum of Natural History.

MEASUREMENTS OF *R. miopus*, in mm.

No.	-	-	1210	5911	5912
Snout to vent	-	-	65	62	63
Length of head	-	-	23	21	23
Breadth of head	-	-	22	21	22
Snout	-	-	9	9.5	10
Eye	-	-	7	6.5	7
Interorbital width	-	-	4.5	5	5
Tympanum	-	-	5	5	5.5
Arm	-	-	39	40	41
1st finger	-	-	11	10.5	10
2nd „	-	-	8	9	8
3rd „	-	-	11	11	11
4th „	-	-	7.5	8	7.5
Hind limb	-	-	100	100	103
Tibia	-	-	32	33	32
Foot	-	-	31	32	32
			Khao Wang Hip (P. Siam).		G. Tahan.

Rana nigrovittata (Blyth).

Bouleng., Rec. Ind. Mus., 1920, XX, p. 144 ; idem. F.M.P., p. 242 ;
 Malcolm Smith, P.Z.S., 1921, p. 433 ; idem., Journ. N.H.S. Siam,
 1922, IV, p. 212.

One example from Kuala Teku (No. 5927).

Boulenger has included this species in the fauna of the Peninsula on the strength of young specimens from the Batu Caves, Selangor. An adult ♀ obtained at Kuala Teku, confirms his opinion.

Colouration. Brown above, with a broad well defined black stripe along the upper half of the flank.

Rana chalconota Schlager.

Rana labialis, F.M.P., p. 242.

Rana chalconota, Bouleng., Rec. Ind. Mus., 1920, XX, p. 201.

Two examples from Kuala Teku.

Rana hosii Bouleng.

F.M.P., p. 243.

One adult ♂ from the Tahan river. (No. 6036).

The tibia is exactly the length of the head and body, and the tibio-tarsal articulation reaches well beyond the snout.

Rana cataracta, sp. nov.

Type adult male, Author's No. 6164, collected on Khao Ram, Nakon Sritamarat Hills, Peninsular Siam, at 300 metres elevation, in Feb. 1922.

Description of type. Vomerine teeth in moderately strong, oblique series, commencing between the choanae and extending beyond their posterior borders, equidistant from each other and from the choanae. Head a little longer than broad, much depressed; snout obtusely pointed, projecting a little beyond the mouth. Canthus rostralis strong, slightly oblique, deeply concave; nostril nearer the end of the snout than the eye; distance between the nostrils greater than the interorbital width, which is less than that of the upper eyelid; eye large and prominent, its diameter nearly equal to the length of the snout; tympanum very distinct, $\frac{2}{3}$ the diameter of the eye, not half as long as its distance from the latter.

Fingers moderately long, the tips dilated into large discs, those of the third and fourth considerably smaller than the tympanum; first finger slightly shorter than second, third longer than the snout; subarticular tubercles large and prominent.

Hind limb long, the tibio-tarsal articulation reaching well beyond the tip of the snout; heels strongly overlapping when the limbs are folded at right angles to the body; tibia once and three-fifths in length of head and body, longer than the foot; a feeble tarsal fold; toes with discs similar to but smaller than those of the fingers, fully webbed, the web involving the bases of the discs, slightly emarginate; outer metatarsals separated to the base; subarticular tubercles moderately large, prominent; inner metatarsal tubercle oval, somewhat flattened, one-third the length of the inner toe; no outer tubercle.

Upper parts finely granulate; coarsely granulate behind the thighs and upon the sides of the body, the latter also with numerous small warts; lower parts smooth. A moderately broad and fairly prominent glandular dorso-lateral fold from the eye to the hip.

Colour. Verdant green in life above, greyish in spirits; sides of the head and body a little darker; limbs with indistinct cross bars; upper lip and the glandule behind it, white. Lower parts white.

Vocal vesicles internal; a moderately strong pad on the first finger. No other sexual characters.

Variation. 21 specimens examined, 11 ♂ 3 ♀, from the type locality, 4 ♂ 3 ♀ from Fraser's Hill. Except

for some slight differences in measurements, the males do not differ in any important character from the type specimen except in having a more prominent, glandular dorso-lateral fold. Females are considerably larger.

Two of the males (Nos. 6532, 6534) from Fraser's Hill are coloured as follows :—Bright green on the back, sides of body and limbs above brown, the latter with darkish crossbars ; below white. Two females from the same locality (Nos. 6535-6) are purplish brown above and on the sides ; below whitish, the throat, chest and under surface of limbs heavily powdered with brown.

Eggs large and unpigmented, 2·5 mm. in diameter.

Rana cataracta is closely allied to *R. hosii* Blgr., and *R. livida* (Blyth).^{*} From the former it differs in the larger tympanum, more coarsely granulate skin, and very distinctly in colouration. From the male of *R. livida*, with its prominent bladder-like external vocal vesicles, it is easily distinguished. The females of the two, except for some slight differences in colouration appear to be indistinguishable from each other.

From *R. chalconata* (Schleg.) another near ally which agrees exactly with it in colouration, and which was found in company with it on Khao Ram, it differs in the longer hind limb, more fully webbed toes and in the absence of the small external metatarsal tubercle.

Remarks. This new frog was first discovered on Khao Ram, on the banks of a stream famous for its series of magnificent waterfalls. It was common at 300 metres altitude, at a couple of large pools where we were camped for some days, but was not found on two other hills in the same range visited on the same trip.

Its habits were those of a true tree frog, perching high up in bushes, or on the trunks of trees, or hopping about on the rocks beside the swiftly flowing water. The call of the male, heard at night only, was a short whistling cry, sometimes almost a scream, and by it they could be tracked down with a lantern and caught.

The *Rana livida* obtained by Wray in the Larut Hills, Perak, should possibly be referred to this species.

^{*} Also to *R. graminea*, Blgr., which appears to differ from *livida* chiefly in the presence of a more or less defined glandular dorso-lateral fold. Originally described from Hainan, this frog has since been found to be widely spread over Siam and Indo-China. I strongly suspect the two will have to be united.

MEASUREMENTS OF *R. cataracta*, FROM KHAO RAM, in mm.*Type.*

No.	-	6169	6160	6163	6162	6164	6165	6166	6170	6186	6187
Snout to vent	-	50	53	54	57	53	55	51	50	86	86
Length of head	-	18	20	20	20	18	21	19	18	29	29
Breadth of head	-	16	17	17	18	16	19	17	16	29	27
Snout -	-	8	8	8.5	8.5	8	9	7.5	7	13	13.5
Eye -	-	6	8	7	7	7.5	8	7.5	7.5	10	10
Interorbital	-	4	4.5	4.5	5	4	5	4	4.5	7.5	8
Tympanum	-	4	4.5	4.5	4	4	4.5	4	4.5	4.5	4.5
Fore limb	-	31	37	35	38	35	37	34	32	57	55
Hind limb	-	92	98	99	110	98	35	97	91	148	150
Tibia -	-	32	32	35	37	34	34	32	32	52	53
Foot -	-	27	29	28	31	29	31	28	28	48	46
Sex -	-	♂	♂	♂	♂	♂	♂	♂	♂	♀	♀

MEASUREMENTS OF SPECIMENS FROM FRASER'S HILL.

No.	-	-	6531	6532	6533	6534	6535	6536	6600
Snout to vent	-	-	49	50	48	46	95	98	104
Length of head	-	-	19	19	18	16	32	34	35
Breadth of head	-	-	16	16	16	14	31	31	34
Snout -	-	-	8	8	7.5	7	14	16	17
Eye -	-	-	7	6.5	7	5.5	11	10.5	12
Interorbital width	-	-	4	4	4.5	4	9.5	9	10
Tympanum	-	-	4	4	4	3.5	6	6.5	5.5
Fore limb	-	-	30	33	30	30	64	67	69
Hind limb	-	-	89	86	90	89	180	186	198
Tibia -	-	-	30	32	30	32	62	67	70
Foot -	-	-	25	27	26	27	52	56	61
Sex -	-	-	♂	♂	♂	♂	♀	♀	♀

*Type to the British Museum of Natural History.****Rana larutensis* Bouleng.***Rana larutensis*, F.M.P., p. 245.*Staurois larutensis*, Bouleng., Ann. Mag. Nat. Hist. (9) 1, 1918, p. 374.

Six examples, Padang, Gunong Tahan and Kuala Teku ; four examples, Fraser's Hill

The largest ♀ is 75 mm., from snout to vent, the largest ♂ 44 mm. Another ♀, 70 mm. in length, taken in December, contained about 800 eggs, unpigmented, each measuring from 1.75 to 2 mm. in diameter. Several tadpoles with fully developed limbs and diminishing tail, but with the large ventral sucker still complete were taken at the same time.

The amount of black blotching upon the upper parts of the frog is variable, and may be so extensive as almost to obscure the green. Some specimens have the throat and under surfaces of the thighs heavily marked with black also.

The male has vocal vesicles fairly well marked externally, the skin on either side of the jaw being thinned and thrown into longitudinal folds.

Rhacophorus leucomystax (Gravenh.).

F.M.P., p. 248.

Three examples from Kuala Tahan and many from Fraser's Hill. In some of these the tibio-tarsal articulation reaches the tip of the snout, in others well beyond. The hind leg of this common tree-frog varies greatly in length, and in the large series in my possession from Siam and Indo-China, the tibio-tarsal articulation reaches beyond the snout in more than half of them. Philippine examples evidently do the same (cf. Taylor, Philippine Amphibia, 1920, p. 289).

Rhacophorus bimaculatus Bouleng.

F.M.P., p. 250.

13 exs. Bukit Fraser.

This tree-frog is very closely allied to *R. reinwardti* Boie, and I doubt if it should really be considered specifically distinct. I have compared the above examples, and 24 more from Khao Luang in the Nakon Sritamarat Hills, Peninsular Siam (unfortunately, only one more than half grown) with 4 specimens of typical *reinwardti* from Java. None of the differences claimed by Boulenger for them will stand.

The vomerine teeth may be in slightly oblique series or perfectly straight. The cutaneous folds above the vent along the sides of the arms and legs may be slightly or strongly developed. No black spots are present on the membrane between the fingers and toes of the Siamese examples, but are present in half the series from the Malay Peninsula.

The character in which the two forms however do consistently differ is in the size of the discs of, and extent of the web between, the fingers and toes. In *reinwardti* the finger discs are always larger than the tympanum and the membrane is fuller, usually extending to the disc of the third finger. In *bimaculatus* the discs are not larger, and often smaller, than the tympanum, and the web never reaches the disc of the third finger.

In addition the membrane of both fingers and toes in *reinwardti* are wider, allowing a more complete separation of the digits. Thus when the fingers of this frog are fully extended, the first and fourth form a straight

line; in *bimaculatus* they make an obtuse angle. The external metatarsals are completely separated in *reinwardti*, in *bimaculatus* not completely.

Tadpoles taken on Fraser's Hill and bred out by me agree entirely with van Kampen's description of the tadpole of *reinwardti* (Nat. Tijds. Ned. Ind., LXIX., 1909, p. 43).

The colouration of *R. bimaculatus* in life shews considerable variation, the upper parts ranging through various shades of green, grey, pink or brown, usually uniform but sometimes with an indistinct dark (upon the back. Below dull yellow the membrane between the fingers yellow, between the toes red or orange, this colour sometimes including the upper arm, flanks and a band along the thighs. Very young specimens are light brownish-green above, with a white throat and belly and yellow limbs.

R. reinwardti appears to have accommodated itself to more lowland conditions, thriving at Buitenzorg, altitude 250 m., while *R. bimaculatus* as far as the Malay Peninsula and Siam is concerned has not been found below 700 m.

Philautus brevipes (Bouleng.).

Ixalus brevipes, Bouleng, Journ. F.M.S. Mus. III., 1908, p. 63, pl. IV., fig. 1; F.M.P., p. 253.

A fine series of 16 specimens of this little tree-frog, hitherto known only from a single example. (Nos. 5970 and 6007 to 6021). One was taken by Mr. Chasen at Kuala Teku on a broad leaf overhanging the water, the remainder are from Camp Padang. The type was obtained by Mr. Robinson on Gunong Tahan at 1,000 metres.

The series agrees well with the description. The tibio-tarsal articulation may reach to the anterior border of the eye. The tympanum varies in distinctness, and is always smaller than the disc of the third finger. The skin of the back is smooth in some, finely shagreened in others.

As is common with many species of *Philautus* the colour is variable. About half the series shew the dark patch on the back, more or less as figured in the description of the type. In others the back is uniformly but coarsely speckled with black all over. Some have no dark bars to the limbs. Greyish olive is the predominating colour above, except in one example which is reddish brown.

The example from Kuala Teku (No. 5970) is pale grey above (under the glass dark grey finely vermiculated with buff), and with a broad irregular buff band along either side of the back. This specimen, the largest, measures 36 mm. from snout to vent.

Several of the females contain ripe ova, the eggs being large, few and pigmented. Diameter 2 mm.

***Philautus castanomerus* (Bouleng.).**

Ixalus castanomerus, Bouleng., Journ. F.M.S. Mus., I., 1905, p. 39, pl. IV., fig. 1; F.M.P., p. 254.

One example, Kuala Teku (No. 5929) ; one example Wray's Camp (No. 5930).

Boulenger's description, drawn up from a single example, agrees entirely with these two specimens except in colouration, a point of little significance with many of the members of this genus, so greatly may they vary both in colouration and in markings.

No. 5930 has the snout obliquely pointed as in the figure, the other, a larger one, has it more acutely pointed owing to the presence of a distinct dermal tip.

Both specimens are dark brown colour above, the smaller one uniform, the larger with indistinct paler mottlings and indications of a dark X ; below pale yellowish-brown, heavily spotted with dark brown.

Boulenger has compared this species with his *P. vermiculatus* ; I can find nothing, however, except colouration and a slightly narrower interorbital region, to separate it from the Javan *P. aurifasciatus* Schlegel, with a specimen of which I have compared it.

***Kalophrynus robinsoni*, sp. nov.**

Type, author's number 5935, collected at Wray's Camp in Oct. 1920 ; presented to the British Museum.

Description of the type. Tongue elliptic, entire. Snout short, truncate, projecting slightly beyond the mouth ; canthus rostralis distinct, loreal region vertical, feebly concave ; interorbital region broader than the upper eyelid ; tympanum distinct, two-thirds the diameter of the eye. First and second fingers very short, not half the length of the third, fourth shorter still ; toes one-third webbed, the web extending as a fringe along the outer sides of the toes ; fifth toe shorter than the third ; tips of fingers and toes bluntly pointed ; a feebly developed oval inner metatarsal tubercle and a rounded outer one. The tibiotarsal articulation reaches the tympanum.

Skin of the back granular, with small scattered tubercles ; a series of tubercles along the dorso-lateral region from the eye to the groin ; belly and groin with large, coarse granules ; throat with finer granules ; a curved fold from the eye to the shoulder.

Light brown above with dark brown markings, in particular a large one on the back extending forwards in two branches to the eyelids, and backwards, in two longer branches to the groins ; sides of head and body very dark brown, this colour sharply defined from the light brown

of the back ; limbs with dark cross bars, and a dark patch enclosing the vent and extending along the back of the thighs. Below yellowish, spotted and speckled with brown.

From snout to vent 17 mm.

Variation. Five examples from the type locality (author's numbers 5934 to 5938 inclusive) and one more from Kuala Teku (5942) do not show much variation from the type specimen. The tympanum is not so distinct in two examples ; in one the series of tubercles along the doso-lateral region is very conspicuous, and there is in addition another series along the hinder side of each thigh as in *K. pleurostigma*. Two specimens have a pink tinge upon the upper parts ; the dark forked mark on the back varies considerably both in extent and shape.

Kalophrynus robinsoni is related to *K. heterochirus* Boulenger, from Borneo, from which it differs in the shorter hind limb, shorter third finger, the strongly tubercular skin and distinctive colouration.¹

The specimens here described are evidently very young. Their characters however are quite distinct. The dermal ridge across the palate behind the choanae is obtusely V shaped and interrupted in the mid-line, as in *K. pleurostigma* ; the ridge in front of the oesophagus is pronounced and strongly denticulate, while the one anterior to it is curved and less strongly denticulate. Boulenger's figure of *K. pleurostigma* in F.M.P., 257, represents the anterior ridge as a continuous curve. In 22 specimens in my collection from various parts of Siam and Indo-China, it is in each one interrupted in the mid-line for some distance. Miss Procter informs me that the palatal ridge of *K. heterochirus* is almost straight, and is just interrupted in the middle.

Microhyla butleri Bouleng.

F.M.P., p. 261.

One juvenile from Kuala Teku ; four adults from Fraser's Hill.

Recently also I have examined a specimen from the He-Ho plain, Southern Shan States, Burma, sent me by Dr. Anandale ; a considerable extension of the known geographical range of this frog.

Microhyla berdmorei (Blyth).

F.M.P., p. 263.

Two juveniles, one from Kuala Teku, the other of unknown origin—the label being lost. It is certainly however from somewhere on this mountain.

This specimen a ♀ (No. 6050) is somewhat remarkable, in that although only 17 mm. in length from snout to vent

1. Kindly compared for me by Miss Procter with the type specimen, now in the British Museum.

it is filled with ripe ova. In every character however it agrees with *M. berdmorei*.

Kaloula baleata (Müller).

Callula baleata, Bouleng., Cat. Batr. Sal., 1882, p. 169.

Kaloula baleata, Barbour, Mem. Mus. Comp. Zool. (1912), XLIV, (1) p. 72.

One adult ♀ (No. 5928) with ripe ova collected at Kuala Tahan, in January. This is the first record of this burrowing frog from the mainland of Asia, although it is well known in the Archipelago.

Phrynella pulchra Bouleng.

F.M.P., p. 265.

A male and female taken in copula in September at Kuala Tahan (Nos. 5931, 5932). They were caught in the bottom of a boat in a pool of water that had collected there from a storm of the previous night. Eggs large and pigmented, the vitelline sphere measures 1.5 mm. in diameter. The male has the pad at the base of the first finger slightly larger than that of the female, but there are no other characters separating the sexes.

Bufo jerboa Bouleng.

F.M.P., p. 271.

One half-grown example of this toad from Kuala Teku.

Bufo penangensis Stol.

F.M.P., p. 270.

One example Kuala Teku. Two examples Fraser's Hill.

The Bukit Fraser examples have dull white markings instead of the usual yellow ones.

Bufo parvus Bouleng.

Two examples Kuala Tahan.

Bufo asper Gravenh.

Apparently common in most localities up to 1,500 metres.

Megalophrys nasuta Cantor.

One example Wray's camp. No. 4947.

Megalophrys longipes Bouleng.

Bouleng. P.Z.S., 1908, p. 415.

One-half grown example from Fraser's Hill.

[*Rana pullus* Smith (antea p. 197) is preoccupied by *Rana pullus* Stoliczka (Journ. Asiat. Soc. Bengal XXXIX 1870, p. 142) and the frog from Chumporn may therefore be known as *Rana tasanæ* (cf. Journ. Nat. Hist. Soc. Siam, VI, 1921, p. 193)].